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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish in continuation of the report by the Government Entomologist and it is hoped that a tour will be arranged for him at the time of coffee blossoming. Planters will be interested to know that the Berna or "Flying Ant" is of some use. As a rule one hastens to destroy these nests as a "nuisance, for many must have seen how they have caused fields to be deserted for days by their attacks. But evidently even a "nuisance" has its uses.

The Scientific Officer publishes an interesting article on "Tea Fluff" as a manure for roses. In olden days used tea leaves have been used for the same purpose, but until lately the use of the fluff had not been recognised. Tea Planters are to be congratulated on having what may be called an indigenous manure at hand, the effects of which so marvellously improve a rosary. As regard Brown Rot or Stump Rot it can best be dealt with by uprooting and burning it. It is drastic but efficacious.

The Labour question as it applies to the Registration Scheme, has drawn a letter from Mr. Mardenán reply to one from Mr. Martin. The Editor does not hold himself responsible for any opinion held by his correspondents. He is willing and anxious to publish any letters on the subject, however, openly expressed, but deprecates personalities. A good cause is often marred by these.

A circular from the Indian Tea Association is printed and it is hoped that next season the suggestion will be carried out by all Tea Planters in Southern India.

Mr. Osborne's report in Coffee at Havre is concluded this week, and will we hope be of use as a reference in the future.

The half yearly Flower Show at the Lal Bagh will be held on the 1st and 2nd February and Mr. Anstead, Scientific Officer has been selected to judge Fruits and the Secretary has been asked to judge the Agricultural Implements.

BEES AND THE FERTILISATION OF COFFEE.

[Continued.]

Report of the Government Entomologist on a tour in the Bababudin District of Mysore State.

"I left Coimbatore on the evening of 30th October and next morning reached Bangalore where I met Mr. G. N. Frattini, the Planting Expert's Assistant for Mysore, and we reached Kadur the same afternoon. Owing to difficulty in obtaining transport we started from Kadur early next morning and reached Chickmagalur the same afternoon. Next day (2nd November) we went on to the Bababudin Hills, where I stayed until 13th November, when I left for Chickmagalur and Kadur and arrived at Mysore on the afternoon of 14th November. Here again there were transport difficulties and it was not until noon on 15th that I was able to start for Sidapur which was finally reached at 3 a.m. next morning. From Sidapur I went to Fairlands Estate on 16th November, on 17th on to Margalli, and on 18th from Margalli to Mercara, where I halted for 3 days. From Mercara my intention was to visit Dunkeld Estate, where considerable damage to Cardamoms by a Scolytid beetle has been reported; but although the distance from Mercara was only some twenty miles, no means of transport were forthcoming and I was reluctantly compelled to abandon this visit. I left Mercara on 22nd November, stayed that night at Santikoppa, and proceeded on to Mysore next day, arriving back at Head Quarters on the morning of 25th November.

"The main object of this tour was to make a preliminary survey of the localities visited with a special view to collecting information regarding the occurrence of Honey-bees and other flower-frequenting insects, with regard to their influence on the pollination of coffee. Incidentally, of course, collections of economic and other insects were made and various interesting habits, etc., noted, but this report is not the place for such details. As the conditions are rather different, the Bababudin Hills and Coorg may be considered separately.

THE BABABUDIN HILLS.

"Three species of true Honey-Bee occur here :—

- (i.) The large Rock Bee (*Apis dorsata*).
- (ii.) The Indian Bee (*Apis indica*).
- (iii.) The small bee (*Apis florea*).

"The large Rock Bee builds regularly at a height of about 5,800 feet on the Eastern face of the Hills, recourse being had to one particular vertical cliff where there is a fair amount of shelter by overhanging rocks. This colony is not a large one, comprising perhaps thirty to forty combs on the average.

"Fairly definite evidence was obtainable that these bees desert their combs on the onset of the S. W. Monsoon (about June) and return again with the N. E. Monsoon (November-December); beyond the general opinion that they fly off in an easterly direction no information was obtainable regarding the locality in which they spend the intervening period. Possibly it is somewhere in the vicinity of Kadur. The swarms which return to the Hills at the end of the year seem to be small ones and perhaps the number of individuals on a comb is greatest at the end of the hot weather (April-May).

Neither honey nor wax appears to be collected systematically whilst the bees are in the Hills. The cliff on which they build is situated well above the limits of the Coffee Estates on this side of the Hills and the Bees, so far as I could ascertain, are not interfered with at all. The reason for their migration from the Hills in June is probably to be found in climatic causes the excessive rain in the Hills during the S. W. Monsoon hindering them from foraging for food.

"The Indian Bee occurs fairly commonly, building as a rule in hollow trees. It is noteworthy that in these Hills the local race of this Bee is much darker than in the Plains and this seems to be the case generally in the montane districts of Southern India. The nests are robbed when found and swarms are sometimes taken and kept in earthen pots although I only heard of one case of even this simple form of apiculture.

"The small Bee was not common at the time of my visit and I was only able to find one small colony. Possibly it migrates in the same way as the Rock Bee. This Bee is regarded as stingless by the local inhabitants and the nests are commonly robbed for the honey which is usually squeezed out and eaten on the spot.

"In addition to the true Honey-Bees, mention may be made of a large tawny-yellow Carpenter Bee (*Xylocopa rufescens*) which was found fairly commonly at flowers after dark. None were to be seen in the day-time but they began to appear in the evening after sunset and flew freely around flowers long after night had fallen. This habit on the part of a Bee was quite new to me but, on looking up the literature, I find that Colonel Bingham recorded its crepuscular flight (*Journal of the Bombay History Society*, Volume VI, page 388); he also found the nest, which consisted of a series of round cells hollowed out in the end of a decaying log. This Bee does not seem to have been recorded from Southern India before, although its peculiar nocturnal habits and comparative abundance (in some localities in these Hills at least) may possess some importance so far as concerns the pollination of coffee.

"Special attention was paid to the insects frequenting flowers. Those found in the day time call for little comment, including the butterflies, bees, flies, etc., usually found. Towards sunset, however, quite a different fauna put in an appearance, the first arrival at the flowers being Hesperid (Skipper) Butterflies and Humming-Bird Hawk-moths (*Microblossum* spp.). As twilight set in, these gave way to numerous other Sphingids (*Hippotion bochariata*, *Dilephila Hypothous*, *Theretra nesus*, *Herse convoluta*, *Nephrole didyma*, etc.) which flew actively from flower to flower accompanied by numerous smaller moths, especially various species of *Plusia* and others of slower flight. The number of flowers visited in an evening by one of those larger Hawk-moths must be very large and it is notable that flowers with very deep nectaries are probably adapted for pollination by means of some of these moths whose tongues in some species (e.g. *H. convoluta*) are much longer than their whole bodies. I expect we shall find, when experiments are made in the coffee-flowering season, that crepuscular and nocturnal insects such as these play a large part in the fertilisation of the blossom, and it may then be considered whether they cannot be encouraged by the planting of attractive bushes such as *Madrass Thorn* (*Duranta*).

"Nests of a small wasp, called locally "Berna" or "Flying Ant" are common in this district being hung from trees. Though often burnt out as

a nuisance, these wasps are probably beneficial by feeding on caterpillars, etc., and rarely attack unless disturbed.

Amongst other insects noticed were:—

Plutell maculipennis, abundant on cabbages;

Athlia proxima, larvae on turnip leaves;

Xylocorhns quadripes, (Coffee Borer); and

Dacus cucurbitae (Fruit Fly) on Marrows.

Note.

With regard to the comb foundation for *Apis indica* kept in artificial hives, mentioned in the Government Entomologist's tour report on the Shevaroyis, he now writes that the Ceylon Agricultural Society will supply this comb foundation at Rs.3 per pound. At present, however, they have great difficulty in getting suitable wax, and they would be prepared to stamp out *Apis indica* foundation in their machine at a nominal charge of Re.1 per pound if wax is supplied. This information will be of interest to would-be bee-keepers in Southern India.

Since the above report on the Government Entomologist's visit to the Bababudins was written I have found the bee *Xylocopa refescens* in Bangalore. It regularly appears at dusk in my garden and visits Sunflowers and Hollyhocks which are in flower in profusion in the borders just now.

R. D. A.

CONDITIONS SUITABLE FOR SISAL HEMP CULTIVATION.

An article in the *Tropical Agriculturist* for September 1912 states that the International Fibre Congress and Exhibition, held at Soerabaya, Java, in 1911, came to the following conclusions regarding the conditions that are best suited for the growing of sisal. The experience is obtained from the cultivation of Agave (chiefly *A cantala*) in Java, where this is the most important fibre plant. It is quite different from the sisal (henequen) of Mexico, which is *A sisalana*:—

"The culture of sisal hemp is not remunerative on lands which do not permit cheap transport of the raw material, nor on poor land nor in a cool region where the yield falls below 650 lb. of fibre per acre. It can be grown with advantage on soil deficient in humus, where cacao and coffee no longer 1,200 feet above sea-level. It is most profitable grown as a secondary product, since it can then be left untouched when the market price is low, or during seasons when the production of leaf is small. It cannot be recommended as a catch crop or intercrop. If sisal is the chief product, estates of less than 700 acres are not profitable. For an estate of 900 acres the cost of upkeep and replanting, upkeep of buildings, managements, etc., together with 5 per cent interest on the capital, will be about 54 rupees per acre. The capital required is estimated at 535,000 rupees. The expenses of harvesting, transport, commission, etc., and depreciation are reckoned at about 100 rupees per ton of fibre, while the value per ton of dry fibre, f.o.b. Java, is about 300 rupees. The net profit, with a production of 650 lb. per acre is not more than 5 per cent., but with a production of 1,300 lb. per acre it increases to 20 per cent."—*The Agricultural News*,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Tea Fluff as a Manure for Roses.—At the Annual Meeting of the U. P. A. S. I. during 1912, Mr. J. S. Nicolls mentioned that he had discovered that tea refuse was an excellent manure for Roses and that it had a marvellous effect upon them. The Chairman, Mr. C. E. Abbott, repeated the experiment with a similar result and when sending me a sample for trial and analysis he wrote, "the result is extraordinary giving flowers six inches across and greatly improving the colour. We applied a double handful to a standard and more to big bushes." Good results have also been obtained with this fertiliser in Bangalore though it was not applied at the most favourable time of the year. Its effect, however, is undoubted.

This material is the yellow fluff which flies about the factories when the tea is sifted. In the first column of the table below is an analysis of it which has been made by the Scientific Officer, and in the second column are figures published in the Indian Tea Association Scientific Department's Quarterly Journal IV of 1911. It will be seen that these figures agree closely, but the South Indian samples contain more moisture and considerably less lime.

	1	2
Moisture ...	10'31	87'48
Organic Matter ...	81'37	
Silica ...	3'16	5'40
Phosphoric acid ...	0'53	0'63
Potash ...	1'61	2'02
Lime ...	0'44	1'44
Oxide of Iron...	0'45	...
Other Mineral Matter ...	2'13	...
	100'00	...
Containing Nitrogen ...	3'24	3'52
Total Ash ...	8'32	12'52

It will be noted that there is nothing very remarkable about this material as a fertiliser to be gathered from its analysis, and in the Ceylon Journal mentioned above its value is said to be "somewhat less than an equal weight of mustard cake." It is, however, a complete fertiliser and being finely divided it probably quickly rots down and becomes available.

Phosphatic fertilisers like Bone Meal and Basic Slag are usually considered good for Roses. While dealing with the subject it may be of interest to mention that the *Gardener's Chronicle* of 28 December contained an article calling attention to the fact that despite the fact that Magnesia is harmful to plants, especially when in excess of lime in the soil, numerous experiments have shown that it is a beneficial fertiliser for Roses. The Ash of the Rose plants contains a large amount of Magnesia. Wolff found it distributed in the following proportions: roots, 7'15; wood, 7'62; leaves, 9'23; flowers, 5'94. It is advised to apply Magnesia to Roses in the form of sulphate in doses of about five ounces per square yard, and kainit is also a useful form of magnesia to use.

Brown Root Disease (*Hymenochaete noxia*).—Dr. Butler, the Imperial Mycologist stationed at Pusa, has very kindly sent a copy of a report he has recently made on this disease for the Imperial Forest Botanist at Dehra Dun. The plant attacked in this case was Hevea Rubber. Dr. Butler says in his report:—

"This disease is common in the Eastern Tropics on a large number of economic plants including rubber, tea, coffee, cacao, camphor, bread fruit, etc. It appears to be seldom found in the perfect fruiting stage of the parasite and most of the cases seem to have been determined in the sterile condition. Even in this state it is characteristic, owing to the brown or black incrustation on the main roots in which are embedded earth, small stones, and plant debris, the whole having a brittle, charcoal-like consistency. Examined under the microscope tawny brown hyphae of a Basidiomycete can be found, often in considerable masses. At first they give a brown colour to the mass, but later on the surface forms a black and rather shiny brittle crust.

"Even when spores cannot be found a characteristic structure may be detected at the surface of the crust. This is the presence of numerous stout rigid bristles which project from the surface, giving it a velvety appearance.

"I have collected typical cases in Assam on tea and have received others through the Scientific Department of the Indian Tea Association. So far as I know, the perfect (sporiferous) stage has not yet been found in India but the fungus appears to be widely present in Indian soils.

"Little is known of the life history. In some cases at least it appears to begin (like several allied diseases) from old decaying stumps of jungle trees. It is stated that spread can only take place along the roots, not through the soil, and that progress from tree to tree is very slow. Spread by spores is not likely to be common.

"The treatment recommended by Ceylon and Straits writers is to remove the diseased trees, with as much of the root system as possible, and also any old stumps found in the immediate neighbourhood, at the same time examining the roots of neighbouring trees, where they approach the diseased one, and cutting out all that show signs of rot. This is said to be sufficient, if thoroughly done, but some recommend the addition of quicklime. The soil should be well turned over at intervals. Replanting can be done early."

This is the fungus which produces the well known 'Stump Rot' in Coffee, Tea, and Rubber, in Southern India and causes a tree to suddenly die with all the leaves and perhaps fruit still hanging to it. A great deal of information about this disease will be found in the pages of the *Chronicle*.

Fish Manure.—Two samples of whole Fish from the West Coast have recently been examined in the laboratory. These contained 4.58 and 4.82 per cent. of Nitrogen and 27.98 and 31.65 per cent. of sand respectively. The percentage of sand is very high indeed and very much diminishes their value, lowering the Nitrogen content and adding considerably to the cost of transport, since some Rs.15 a ton is being paid for carting sand. This is emphasised by the fact that a sample of a mixture of Fish and Neem Poonac delivered in another district contained 24.14 per cent. of sand. Planters should insist upon Fish Manure containing only 2 or 3 per cent. of sand at the most.

R. D. A.

CORRESPONDENCE.

Labour Question.

Dear Sir.—With reference to Mr. Martin's letter to Mr. Hughes re Registration which was read in the Extraordinary General Meeting held by the Kanan Devan Planters' Association on the 23rd ultimo it appears to me that Mr. Martin has rather not been given much information in the proposed Registration Scheme or has not taken the trouble to try to understand it. I will take extracts from Mr. Martin's letter to criticise. (1) "I consider the Scheme unworkable." In the first place he states that he considers the scheme unworkable but wisely refrains from committing himself as to whether the unworkability lies in the scheme itself or with the planters, or for any other reasons. Equally large Finger Print Bureaux as the proposed one are being worked in Europe with great success and there seems no reason why one should not be worked here.

(2.) "No Scheme can stop Emigration." This scheme is not advanced with the idea of stopping emigration except as regards those who should not be allowed to do so on account of their indebtedness in this country. It is, I believe, an accepted fact that the planting community are at present suffering from considerable losses caused by coolies and maistries absconding, not only by emigrating, but by going from estate to estate and from District to District and that the practice is becoming more and more common and it is to hinder this that the registration scheme has been suggested, as it has been found impossible for the Police to catch the majority of the offenders. It is true, as Mr. Martin says, that there is nothing to prevent emigrants from travelling 1st class; but if the scheme is to apply to emigrants at all we shall have a law which will cause considerable inconvenience to cooly recruiters if they smuggle out of this country coolies who have no pass from the Registration Office, and it will be easier for the cooly recruiters to take finger prints and get a pass than to have the trouble of evading the law and running considerable risks by doing so. We do not want to stop emigration but we do want to stop emigrants from going off with our money and causing us loss by not carrying out contracts.

(3.) "The Scheme might enable a Registerer to catch persons whose finger prints are registered—true, but having caught them what can be done with them." I am glad Mr. Martin realizes that Registration may be able to catch delinquents—for this is all it is meant to do. After that the law deals with them. Now-a-days the difficulty is to catch your cooly even the first time he absconds. With registration he would be caught every time he tried to get advance on a registering estate, and it is possible that Government might realize the present scale of punishments are not sufficiently deterrent, or that the delinquents might prefer to complete their contracts. Those bent on "bilking" their employers would avoid registering estates so the police would have an easier job in searching estates which did not register. Also it would be simple for coolies to take advances from non-registering estates, and then go to a registering one where they knew there would be nothing against them.

(4.) "Are we to return to the days of slavery and the lash?" Comparing the taking of finger prints to slavery is absurd, and it is difficult to see where "the lash" comes in as even mild whipping has been abolished for breach of civil law. What possible objection can a professedly honest person have to giving his finger prints. Perhaps it would be best to regard this sentence as a mild attempt of (pointless) rhetoric.

(5.) "The coolies have only to go to the nearest Magistrate and say they do not wish to work with Mr. Registerer and claim the protection, of

the Court." If anyone can make contracts and evade their liabilities in this way why work? Would Mr. Martin kindly quote us any law confirming this line of action?

(6.) "How many planters.....are going to take the trouble of returning paid off coolies imprints?" This remark shows how carelessly Mr. Martin must have studied the scheme; as it was never suggested that any imprints should ever be retained by a registerer. At the end of a year the registration number of any finger print would automatically be cancelled, unless a renewal fee were paid.

(7.) "Who is going to pay the cost of feeding coolies while experts make up their minds how many of the gang are and how many are not registered?" I fancy Recruiters would not take long to realize that it would be as well not to advance coolies or feed them before they obtained a clear pass from the Registration Office. The time it would take to trace any finger print is only a matter of a few minutes and is not a matter of "making up any one's mind."

(8.) "What is to prevent my going to Thondi and shipping from there?" If the scheme is to be worked Government will only have certain ports licensed for the emigration of indentured coolies and recruiters would if they shipped coolies from elsewhere lay themselves open to punishment.

(9.) "Can Government justly refuse the same rights to Indian planters of rice and other products." This sentence is a little ambiguous but I presume Mr. Martin means by "rights" the right to prevent persons under contract from absconding if the delinquents can be prevented. The "planters of rice and other products" could do what we propose doing, i.e., have a registration scheme of their own, if worth their while. The Registration Scheme is only to help the police to enforce the law.

(10.) "The Scheme is inadvisable being in the nature of class legislation." I am no lawyer so should be glad to learn how the legislation, we ask for, which is only to license certain ports for emigration, can be called "class legislation," any more than factory, emigration, and many other Acts made in the public interests. Government, we presume, is not anxious to encourage people to avoid their liabilities, and the proposed scheme is, as I said before, only to help the police to enforce the law, and could be applied to any business, e.g., servants, clerks and employers of any kind. I can quite understand that the scheme is distasteful to all cooly recruiters whose interest ceases when the labour is delivered.

The rest of the letter is again off the rails of argument. I should have thought that Mr. Martin's long experience would have taught him that coolies can make much more by absconding from time to time than by working steadily for any pay planters can offer. As pay rises, so do advances, and the regular absconder makes the pay (whatever that may be) plus his advance. If planters gave a bonus on fulfilled contracts it might stop a certain amount of absconding, but it would have to be a high bonus, and would start a fresh line of competition among themselves which is what we want to avoid. No Government will make registration compulsory nor can they force planters to give advances if they say they will not do so unless a cooly registers. If Government refuse to license only certain ports for emigration, registration, if generally adopted, will stop absconding from estate to estate and district to district.

Ill-considered flippant letters such as those I have seen written by Mr. Martin from time to time do much harm amongst those who have not the time or necessary information to dissect them.

(Signed) O. W. MARDEN,

January 23, 1913.

THE INDIAN TEA ASSOCIATION.

Royal Exchange Building,
Calcutta, 19th December 1912.

Circular No. 39.

Marking of Tea Chests.

Dear Sirs,

The subjoined copy of a circular of 8th November which has been issued by the India Tea Association (London) to its members inviting attention to the desirability of having tea chests from India prominently marked "Pure Indian Tea" is circulated for information. The Committee understand that the suggestion is being adopted by several firms and that they have issued instructions that tea chests from gardens under their agency should be so marked in future. It seems to the Committee that the proposal is an excellent one, for the reasons stated in the London Association's circular; they desire to recommend it to the careful consideration of all members, and to express the hope that it will be generally adopted.

D. K. CUNNISON,

Assistant Secretary.

DAVID LONDON, E. C., THE 8TH NOVEMBER, 1912.

From—The Secretary, Indian Tea Association (London).

To—All Members of the Association.

A practical and inexpensive method of drawing attention to *Indian Teas*, at present little known outside big centres in comparison with the products of Ceylon and China has been suggested, and it is possible only by the goodwill and co-operation of Boards, Agency Houses and Proprietors. This is by stencilling the words *Pure Indian Tea* prominently on all chests leaving the factory. The words "Pure Indian Tea" are suggested, as the purity of Indian Tea has always been a feature of its advertisement wherever made under the auspices of the Tea Cess.

Tea chests after sale, especially Venesta's, are extensively used for packing other commodities, and circulated all over the country, often going abroad, while original chests of Indian Tea find their way into the Provinces and may be seen in grocers' shops; but, beyond the garden mark, grade of tea, and weight, bear no indication of the country of origin, whereas similar chests from Ceylon almost invariably bear prominently the words "Ceylon Tea."

The Committee venture to ask for your co-operation by the issue of the necessary orders to secure that the above words be stencilled prominently on all chests despatched from the commencement of next season.

In the Book of Proceedings of the last Annual Meeting it will be remembered that a very interesting speech was published by the Hon'ble Mr. Jackson, and was listened to with great attention, on the subject of the Tea Cess and its renewal. The figures he gave were conclusive, and the advice, he gave to take advantage of the prosperous time has borne fruit and the Tea planters are to be congratulated that the Tea Cess is to be renewed for a further five years.

COFFEE.**Coffee at Havre.***(Continued.)*

The total imports of raw coffee into France for consumption in the calendar year 1911 amounted to 244,823,031 pounds valued at \$24,219,184! about one-half was Brazilian coffee. The following table shows the quantities, by countries of origin, imported in the calendar years 1909, 1910 and 1911.

Countries.	1909.	Pounds. 1910.	1911.
Netherlands ...	196,870	147,267	195,548
England ...	277,559	194,225	139,110
British India ...	12,465,910	12,362,735	13,977,384
Venezuela ...	10,829,215	13,312,918	21,642,558
Brazil ...	140,911,859	146,155,720	126,038,525
Hayti ...	38,141,564	35,851,646	40,882,543
Porto Rico ...	3,508,179	2,432,555	2,578,059
Guadeloupe ...	1,917,561	1,668,220	1,902,349
Reunion ...	293,432	314,375	263,890
Other countries ...	29,426,780	34,095,461	37,203,065
Total quantity ...	237,968,929	246,535,122	244,823,031
Total value ...	\$21,666,180	\$24,388,445	\$24,219,184

AVERAGE PRICES.

The following table, compiled from reliable sources, shows the highest, lowest and average prices per pound of coffee in commercial transactions at Havre for the periods or crop years specified from 1850 up to the present time:—

		Lowest,	Cents. Highest.	Average.
10 and 5 years periods:—				
1851-1860 ...		7'0	12'8	9'1
1861-1870 ...		8'4	15'0	12'9
1871-1880 ...		9'1	25'9	16'3
1881-1890 ...		7'1	21'5	12'2
1891-1895 ...		13'8	23'1	17'0
1896-1900 ...		5'4	16'8	9'1
1901-1905 ...		5'1	9'8	6'9
1906-1910 ...		6'0	8'6	7'6
Seasons:—				
1900-1901 ...		6'1	9'8	7'4
1901-1902 ...		5'7	8'5	6'6
1902-1903 ...		5'2	6'8	5'9
1903-1904 ...		5'1	8'7	6'7
1904-1905 ...		7'0	8'8	7'8
1905-1906 ...		7'6	8'6	8'2
1906-1907 ...		6'0	8'6	7'2
1907-1908 ...		6'1	7'8	7'2
1908-1909 ...		6'4	8'0	7'3
1909-1910 ...		7'0	8'5	7'8
1910-1911 ...		8'0	12'9	10'8
1911-1912 ...		11'9	15'7	14'0

A competent authority in this city, when asked to explain the extreme fluctuations in the above table, attributed them wholly to natural causes and

the normal operation of the law of supply and demand. "The rise in the average price at Havre," said he, "from 9.1 cents a pound in 1850 to an average of 12.9 in the period 1861-1870, 16.3 cents in 1871-1880, and to 17 cents in 1891-1895 was due to an increase in consumption as well as to unfavourable reports concerning future crops. The fall in price to 5.9 cents a pound in 1902-3 was due to an excess of production. The present average price (15.4 cents on October 17) is due to bad crops and unfavourable reports respecting the future. The same authority states that the recent shipments of valorised coffee from Havre to the United States represented coffee repurchased by the Brazilian Government "in order to safe-guard the interests of the planters."

The current retail price for a good grade of Porto Rican coffee is 37.7 cents per pound. For purposes of comparison it may be stated that the retail prices per pound for other coffees are now as follows, in cents. St. Marc, 32.2; Malabar, 35; Santos, 31.3; Rio, 31.3; Gonaives, 31.3; Mocha, 36.8; Java, 36.8; Bourbon, 37.7. Porto Rican coffee is highly regarded in France and is frequently blended with Mocha in equal proportions.

THE WORLD'S CONSUMPTION OF COFFEE.

E. Laneville, of Havre, has recently compiled statistics of the world's consumption of coffee, showing the per capita consumption of each country. The following table is based on these statistics, reduced to American equivalents:—

Countries.	Total consumption, bags.		Per capita con- sumption 1911.
	1901.	1911.	lbs.
United States	... 6,215,000	7,085,000	6,885,000
Germany	... 2,690,000	3,020,000	2,985,000
France	... 1,350,000	1,790,000	1,775,000
Austria-Hungary	... 705,000	920,000	895,000
South Africa, Argentine and Brazil	... 380,000	860,000	835,000
Netherlands	... 625,000	700,000	700,000
Belgium	... 510,000	625,000	600,000
Sweden	... 460,000	585,000	575,000
Italy	... 255,000	405,000	425,000
Russia	... 325,000	410,000	405,000
Denmark	... 155,000	235,000	245,000
Norway	... 190,000	225,000	225,000
Turkey, (all)	... 170,000	230,000	225,000
Spain	... 145,000	225,000	215,000
Great Britain	... 240,000	215,000	210,000
Switzerland	... 145,000	180,000	170,000
Algeria	... 90,000	125,000	125,000
Greece, Roumania, Servia, Bulgaria	... 90,000	125,000	115,000
Egypt and N. Africa	... 60,000	95,000	105,000
Portugal	... 45,000	55,000	60,000
Total	... 14,845,000	18,110,000	17,775,000

It appears from the above table that the six countries consuming the largest quantity of coffee in the calendar year 1911 were the United States, Germany, France, Austria-Hungary, the Netherlands and Belgium. The six countries which showed the highest per capita consumption were, in the order mentioned, the Netherlands, Sweden, Norway, Denmark, Belgium and the United States.—*The Spice Mill.*

RUBBER.

Natural and Synthetic Rubber.

Under the above title an interesting address was delivered by Dr. F. Mollwo Perkin before the Society of Arts on December 11. After briefly reviewing the history of the development of the india-rubber industry and the nature of the processes used in extracting the natural product and in vulcanisation, an account was given of the recent synthetic processes by which the manufacture of artificial rubber on the large scale has become a commercial possibility. In the process of the Synthetic Products Co., isoprene is made from fusel oil, which is fractionated so as to give *isoamyl* alcohol, $\text{CH}(\text{CH}_3)_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{OH}$, which is converted into the chloride, $\text{CH}(\text{CH}_3)_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{Cl}$ by the action of hydrochloric acid and then into the dichloride $\text{C}(\text{CH}_3)_2 \cdot \text{Cl} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{Cl}$ by the action of chlorine, under specially controlled conditions; the dichloride obtained is passed through a tube heated at 470° and filled with soda-lime whereby it is converted into isoprene, which can be polymerised to rubber by means of small quantities of sodium.

The only difficulty in the way of this process is the cost of the raw product, amyl alcohol, which is about 1,402 per ton. On this account, Prof. W. H. Perkin, with E. H. Strange, F. E. Matthews, and Prof. Fernbach, devised a process for obtaining butyl alcohol cheaply, from which butadiene could be obtained. By the employment of a certain organism, it was found possible to ferment starch, and, more recently, sawdust, so as to obtain butyl alcohol and acetone, the latter being sold, thus cheapening the cost of the butyl alcohol. The butyl alcohol is chlorinated in the same way as the *isoamyl* alcohol, and by similar treatment with soda-lime yields butadiene, $\text{CH}_2 : \text{CH} \cdot \text{CH} : \text{CH}_2$ which on polymerisation gives a rubber which, although not chemically identical with the polymerised isoprene, has all the properties of natural rubber in regard to elasticity and behaviour towards sulphur on vulcanisation.

An account was also given in the lecture of the processes devised by the firm of Friedrich Bayer, of Elberfeld, and of the interesting fact discovered by Prof. Harries that the presence of a small quantity of rubber ozonide very much increases the rapidity of polymerisation of isoprene and its derivatives.

In discussing the question of the competition of natural and synthetic rubber, it is pointed out that "at present prices and with the present supply and demand there is no reason, provided synthetic rubber is as good as natural rubber, why the two should not exist side by side." But the rubber planter is bidden to take heed of the lesson taught by the fate of the natural alizarin and indigo industries and consider possibilities of improving the yield of natural rubber by better methods of tapping, coagulation, the study of agricultural conditions, and possible improvements by fertilisation and the suppression of insect pests, which play havoc with the young trees. It is a significant fact that the Badische Anilin und Soda-Fabrik has agreed to put by £1,000,000 for research in connection with synthetic rubber, just as nearly £1,000,000 was expended by the same firm in research before synthetic indigo was placed on the market.—*Nature*.

The above is interesting reading but it is as well to remember that Dr. Lothar E. Weber, Ph. D. has said in the *India Rubber World*: "I do not want to make such a rash statement as to assert that synthetic rubber will never be a commercial possibility, but I should be greatly surprised if there is anybody engaged in the rubber industry to-day who will have the opportunity of seeing synthetic rubber in open competition with the natural product."